

TEMPERATURE-SALINITY TOLERANCE LIMITS OF THE  
SOLDIER FLY LARVAE OF *ODONTOMYIA COMMUNIS*  
JAMES, 1939, FROM  
BADWATER, DEATH VALLEY, CALIFORNIA<sup>1</sup>

Alex W. Klishevich and Wayne P. Alley<sup>2</sup>

Monthly observations taken at Badwater, Death Valley, from January 1970 to February 1971 showed that larvae of *Odontomyia communis* James, 1939 were capable of surviving a myriad of environmental conditions. Water temperatures fluctuated from a low of 8°C in December to a high of 41°C in May. In addition, salinities varied from a winter low of 25 ppt to a summer high of 58 ppt in August.

These stratiomyiid larvae are very abundant in the ponded areas of Badwater from late spring to late summer, but are only occasionally found from November to March when water temperatures and salinities would seem more suitable for survival. Since ambient temperatures and salinities are not limiting factors for these larvae, specimens were brought back to the laboratory July 17, 1971 so that tests could be conducted to determine their temperature and salinity tolerances.

In order to avoid disrupting the ecology of Badwater, only limited collecting was allowed by the National Park Service which administers the Death Valley National Monument. For this reason a less than representative number of larvae could be used in these tests; however, the results do show some definitive trends.

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<sup>2</sup> Department of Biology, California State University at Los Angeles, Los Angeles, California 90032.

Salinity concentrations, containing distilled water and sodium chloride, were prepared in the following concentrations: 0, 30, 60, 90, 120 ppt. Sodium chloride was used in the preparation of the solutions because an analysis of Badwater spring water by the authors indicated that 75 per cent of the total dissolved solids was composed of this salt. One hundred ml of solution was placed in a beaker with 10 larvae and a battery of these beakers was placed in water baths of 35°C, 40°C, and 45°C for 24 hours. The per cent mortality, determined for each beaker at the end of the testing period, is shown in Table I.

Table I. Per cent Mortality of *Odontomyia communis* Larvae at Various Combinations of Temperature and Salinity.

Temperature, Centigrade	Salinity, Parts Per Thousand				
	0	30	60	90	120
35	20	0	0	0	0
40	40	0	0	0	0
45	100	100	100	100	100

The results clearly demonstrate that these larvae can easily tolerate salinities approaching three times the salinity of sea water, provided that water temperatures do not exceed 40°C. In fact, larvae of *Odontomyia communis* appear to be more vulnerable to low salinities since the only mortality, which was observed between temperatures of 35°C to 40°C, was found among larvae placed in distilled water. The maximum tolerable temperatures of these larvae must lie between 45°C and 41°C because field observations showed that larvae were alive at 41°C and all laboratory specimens were killed by temperatures of 45°C. The laboratory results and field observations strongly indicate that the larvae approach their upper temperature limits in the summer months.

*Descriptors:* Stratiomyidae; Soldier fly larvae, *Odontomyia communis*; Badwater, Death Valley, California.